L 13345-63       EWT(j)/EPF(c)/EWT(m)/BDS    Po-4/Pr-4   RM/WW

AUTHOR: Bytkovchenko, V. G.; Bereзin, I. V.

TITLE: Investigation of the kinetics and mechanism of the liquid phase oxidation of cyclododecane with molecular oxygen 3. Decomposition kinetics of cyclododecyl hydroperoxide.

TOPIC TAGS: cyclododecyl hydroperoxide, cyclododecane, alpha-naphthol cyclododecyl hydroperoxide decomposition

ABSTRACT: This work is dedicated to the study of the kinetics of the decomposition of cyclododecyl hydroperoxide in the process of oxidation of cyclododecane. Cyclododecyl hydroperoxide is the main product of oxidation of cyclododecane. When cyclododecane is subjected to 150C in the presence of oxygen for the first 40 minutes, the peroxide reaction is practically the only product of oxidation. The main oxidation products are formed by means of peroxide decomposition. The activation energy and the dependence of the

Card 1/2

BEREZIN, I.V.; GO CHU [Kuo Ch'u]

Study of elementary reactions involved in the detachment of a
tritium atom from pentatriacontane 18t by free cyclohexyl and
heptyl radicals in the liquid phase. Dokl. AN SSSR 142 no.2:383-
386 Ja '62. (MIRA 15:2)

1. Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova.
Predstavleno akademikom N.N.Semenovym.
(Pentatriacontane)
(Tritium)
(Radicals(Chemistry))

The influence of structure ...

S/020/62/144/002/022/028
B101/B110

N. Y., 1954, p. 500.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova
(Moscow State University imeni M. V. Lomonosov)

PRESENTED: December 26, 1961, by N. N. Semenov, Academician

SUBMITTED: December 26, 1961

Card 3/3

The influence of structure ...

non-radioactive heptane gave more exact values than that of $C_6H_6$ with $C_7H_{16}$.
(2) The composition of the medium influences especially the ratio of the
reaction constants of cis-decalin, methyl cyclopentane, benzene, and above
all that of isooctane. (3) $k_\sigma^H/k_{hept}^H$ depends on the structure of the
hydrocarbon. The values referred to a secondary bond of heptane for 80°C
are respectively: 0.1 and 3.7 for primary bonds of heptane and toluene;
1.0, 0.89, and 1.42 for non-conjugate secondary bonds of heptane,
cyclohexane, and cyclopentane; 35.1, 38.5, and 95 for conjugate secondary
bonds of cyclohexene, methyl cyclopentene, and 1,3-cyclohexadiene; 9.6,
13.7, 6.65, and 17.9 for tertiary bonds of methyl cyclohexane, methyl
cyclopentane, trans-decalin, and cis-decalin; 0.067 and 0.068 for aromatic
C-H bonds of benzene and toluene. (4) The low value of $k_\sigma^H/k_{hept}^H$ for
2,2,4-trimethyl pentane (isooctane) (1.6 ± 0.1 for $[C_7H_{16}]$ = 100%, 4.2 for
$[RH]$ = 100%) indicates that the reactive bonds are screened by the methyl
groups. There are 1 figure and 2 tables. The most important English-
language references are: J. A. Meyer, V. Stannet, M. Szwarc, J. Am. Chem.
Soc., 83, 25 (1961); E. W. R. Steacie, Atomic and Free Radical Reactions,
Card 2/3

5.3300

AUTHORS: Berezin, I. V., and Dobish, O.

TITLE: The influence of structure and medium on the reactivity of hydrocarbons with free methyl radicals in the liquid phase

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 144, no. 2, 1962, 374-377

TEXT: The reactivity of hydrocarbons with $CH_3$ (rate constant $k_\sigma^H$) was determined by concurrent reactions using n-heptane-4t as standard. Free $CH_3^\bullet$ radicals were obtained by thermal decomposition of acetyl peroxide at 60-90°C. The ratio of the rate constants is given by

$$k_\sigma^H/k_{hept}^H = 10.5\left[(I_0 - I)/I\right]\cdot \left[C_7H_{16}\right]/\left[RH\right],$$

where $I_0$ is the molar activity of $CH_4$ reacting with $C_7H_{16}$ - t only, and I is that of $CH_4$ reacting with $C_7N_{16}$ + RH. Results: (1) $k_\sigma^H/k_{hept}^H$ depends linearly on the composition of the mixture. Hence, only values extrapolated for zero concentration of the hydrocarbon in question can be intercompared. The reaction of $C_6H_6$-t with

Card 1/3

BEREZIN, I.V.; VATSEK, K.; KAZANSKAYA, N.F.

Interaction of free methyl radicals with the hydroxyl hydrogen
atoms of tertiary butyl alcohol. Role of hydrogen bonds. Dokl.
AN SSSR 144 no.1:139-142 My '62.                    (MIRA 15:5)

1. Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova.
Predstavleno akademikom N.N.Semenovym.
   (Radicals (Chemistry)) (Butyl alcohol) (Hydrogen bonding)

BEREZIN, I.V.; DOBISH, O.

Reactivity of saturated hydrocarbons in their interaction
with free methyl radicals in the liquid phase.  Dokl. AN SSSR
142 no.1:105-108 Ja '62.                               (MIRA 14:12)

1.  Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova.
Predstavleno akademikom N.N. Semenovym.
          (Hydrocarbons)             (Radicals (Chemistry))

BEREZIN, I.V.; KAZANSKAYA, N.F.

Kinetic isotopic effect of secondary tritium atoms of the
n.heptane-t molecule in the liquid phase reaction with free
methyl radicals, and the reactivity of 4-C - T bonds. Zhur.
fiz.khim. 36 no.8:1800-1802 Ag '62. (MIRA 15:8)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova.
    (Tritium)     (Heptane)    (Radicals (Chemistry))

ANTONOVSKIY, V.L.; BEREZIN, I.V.; KAZANSKAYA, N.F.

Use of tritium for determining the relative constants of the rate
of detachment of hydrogen atoms in organic compounds. Relative
reactivity of carbon-hydrogen bonds of hydrocarbons in radical
reactions. Izv.vys.ucheb.zav.; khim.i khim.tekh. 5 no.1:94-100
'62.                                                     (MIRA 15:4)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova,
kafedra khimicheskoy kinetiki.
    (Hydrogen bonding)   (Hydrocarbons)  (Radicals (Chemistry))

BEREZIN, I.V.; KAZANSKAYA, N.F.; MARTINEK, K.

Reactivity of toluene bonds in the reaction with free methyl
radicals. Zhur. fiz. khim. 35 no.9:2039-2046 '61. (MIRA 14:10)

1. Moskovskiy gosudarstvennyy universitet imeni M.V. Lomonosova.
(Toluene) (Radicals (Chemistry))

Investigation of the kinetics of ...          S/081/62/000/004/004/087
                                              B149/B101

substituted in toluene in the ortho, meta, and para positions and in the
$CH_3$ group has been determined. The probable mechanism of the reaction
between the $CH_3$ radical and the T atom in the hydroxyl group in trimethyl
carbinol is considered and the abnormally high value of the factor of the
power function and of the activation energy of this process is explained.
The possibility of using T for approximate determination of the relative
R of free radicals is demonstrated. [Abstracter's note: Complete transla-
tion.]

Card 2/2

*JJ. 1510*

*JJ. 0132.*

AUTHORS:     Berezin I. V., Vatsek K., Kuo-Ch'u, Dobish O.,
             Kazanskaya N. F.

TITLE:       Investigation of the kinetics of elementary free-radical
             reactions in the liquid phase using tritium

PERIODICAL:  Referativnyy zhurnal. Khimiya, no. 4, 1962, 62, abstract
             4B429 (Tr. po khimii i khim. tekhnol. [Gor'kiy] no. I, 1961,
             18-30)

TEXT:  The reactivity (R) of cis-decalin (I) and trans-decalin (II) in the
reaction with free radical $CH_3$, generated by decomposition of acetyl
peroxide at $55-90°C$ was investigated with the help of tritium (T).  The
rate·of reaction of I and II with $CH_3$ was measured with reference to the
standard reaction of breaking off a T atom from tritium-containing
cyclohexane by the $CH_3$ radical.  The ratio of the rate constants for the
reactions between $CH_3$ and I and II is 1.56.  The relative R of T atoms,

Card 1/2

BEREZIN, I.V.; RAGIMOVA, A.M.

Mechanism of decarboxylation of acids in the liquid phase
oxidation of hydrocarbons. Role of polar factors in free
radical reactions. Zhur. fiz. khim. 36 no.3:581-5%/ Mr '62.

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova.
(MIRA 17:8)

PHASE I BOOK EXPLOITATION

SOV/6319

Berezin, Il'ya Vasil'yevich, Yevgeniy Timofeyevich Denisov, and Nikolay Markovich Emanuel'

Okisleniye tsiklogeksana (Oxidation of Cyclohexane) [Moscow] Izd-vo Mosk. univ., 1962. 301 p. Errata slip inserted. 3500 copies printed.

Ed.: N. A. Korobtsova; Tech. Ed.: T. A. Kozlova.

PURPOSE: This book is intended for chemists and chemical engineers engaged in the industrial oxidation of cyclohexane.

COVERAGE: The book discusses current theory and technology of cyclohexane oxidation. Although the text is based primarily on non-Soviet materials, the discussion of kinetics is taken entirely from N. N. Semenov's theory of degenerate-branched chain reactions. The oxidation of cyclohexane is presented in the broadest range, e.g., from elementary reactions to the technological process. References are given at the end of each chapter.

Card 1/4

84691

Kinetic Isotopic Effects of Tritium in the
Reaction of Hydrocarbons With Free Methyl
Radicals in the Liquid Phase

S/020/60/134/004/017/023
B004/B064

and cyclopentane the authors conclude that the kinetic isotopic effect
of tritium in the reaction with $CH_3^.$ for the unconjugated aliphatic
secondary CH bonds is described by the relation $i = 0.18 \exp(3450/RT)$.
In the case of cyclohexane a distinction is to be made between polar
and equatorial bonds. Assuming that $i_{equ} = i_{sec} = 0.18 \exp(3450/RT)$
the following relation is found for $i_{pol}$ $i_{pol} = 0.48 \exp(2300/RT)$.
The largely deviating values for benzene and toluene are due to the
effect of the aromatic cycle. There are 3 tables and 10 references:
6 Soviet, 3 US, and 1 French.

ASSOCIATION:   Moskovskiy gosudarstvennyy universitet im. M. V. Lomono-
sova (Moscow State University imeni M. V. Lomonosov)

PRESENTED:    April 27, 1960 by N. N. Semenov, Academician

SUBMITTED:    March 28, 1960

Card 3/3

Kinetic Isotopic Effects of Tritium in the
Reaction of Hydrocarbons With Free Methyl
Radicals in the Liquid Phase

S/020/60/134/004/017/023
B004/B064

hydrocarbons tagged with tritium was carried out at 55 - 85°C. Table 1 gives
data for $I_{C_6H_6}$, $I_{CH_4}$, and i at 85°C. Table 2 shows the values for benzene
and toluene at 55, 70, and 85°C. The function $\log(k^H/k^T) = f(1/T)$ was found
to be linear. Table 3 compares the values obtained for different hydro-
carbons at 85°C. The ratio $A^H/A^T$ of the factors of the exponential function,
the difference $\Delta E = E^T - E^H$ of the activation energies, and i are given
in Table 3:

| Hydrocarbon | $A^H/A^T$ | $\Delta E$, kcal/mole | i |
|---|---|---|---|
| Benzene ] | 0.66 | 1570±100 | 6.0 |
| toluene ] | 0.55 | 2200±100 | 12.1 |
| cyclohexane ] | 0.38 | 2700±100 | 17.2 |
| cyclopentane | 0.16 | 3500±350 | 22.8 |
| cycloheptane | 0.19 | 3430±250 | 23.5 |
| n-heptane | 0.20 | 3400±130 | 23.2 |
| (sec. bonds) | | | |

From the data found for the secondary bonds of n-heptane, cycloheptane,

Card 2/3

84691

11. 1210
5.3200

AUTHORS: Antonovskiy, V. L. and Berezin, I. V.

TITLE: Kinetic Isotopic Effects of Tritium in the Reaction of Hydrocarbons With Free Methyl Radicals in the Liquid Phase

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 134, No. 4, pp. 860-863

TEXT: The authors determined the intramolecular kinetic effects $i = k^H/k^T$ in the reaction of liquid hydrocarbons with free methyl radicals. The reaction equations are written down: $RH + CH_3^\cdot \xrightarrow{k^H} R^\circ + CH_4$ (I) and $RT + CH_3^\cdot \xrightarrow{k^T} R^\circ + CH_3T$ (II). Assuming n reactive CH bonds in the RH molecule, and a concentration ratio of $[RT] \ll [RH]$ the authors obtain for i the equation $i = I_{RH}/nI_M$ (1), where $I_{RH}$ denotes the specific radioactivity of RH, $I_M$ the specific radioactivity of the forming methane. Benzoyl peroxide served as a source for the methyl radicals; its decomposition in

Card 1/3

The Relative Reactivity of the C-H and C-T Bonds   83903
of n-Heptane, Benzene, Toluene, Ethylbenzene, and  S/020/60/134/003/017/020
Cyclohexane in the Interaction With $CH_3$· in the  B004/B067
Liquid Phase

PRESENTED:   April 27, 1960, by N. N. Semenov, Academician

SUBMITTED:   March 28, 1960

Card 4/4

The Relative Reactivity of the C-H and C-T Bonds
of n-Heptane, Benzene, Toluene, Ethylbenzene, and
Cyclohexane in the Interaction With $CH_3$, in the
Liquid Phase

83903
S/020/60/134/003/017/020
B004/B067

carried out to eliminate this specific effect of the aromatic cycle.
$C_6H_5CH_3$ and $C_6H_5CH_2CH_3$ were tagged with tritium in their $CH_3$ group,
dissolved in small concentrations (0.134 - 4.00 wt%) in non-tagged
$C_6H_{12}$, and reacted with $CH_3$. Under these experimental conditions the
relative rate constants for the tearing off of tritium did no longer depend
on the composition (Tables 2,3). The following ratio was obtained for
$85^\circ C$: $k_{hept}^T$ : $k_{eth.benz.}^T$ : $k_{tol}^T$ = 1 : 14.5 : 28. Thus, the phenyl group
has a strongly activating effect on the hydrogen atoms of the $CH_3$ group
in toluene as well as in ethylbenzene. The high mobility of the primary
hydrogen atoms in $C_6H_5C_2H_5$ might indicate a still unknown mechanism.
There are 2 figures, 3 tables, and 8 references: 5 Soviet and 3 US.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im.M.V. Lomonosova
(Moscow State University imeni M. V. Lomonosov)

Card 3/4

83903

The Relative Reactivity of the C-H and C-T Bonds   S/020/60/134/003/017/020
of n-Heptane, Benzene, Toluene, Ethylbenzene, and B004/B067
Cyclohexane in the Interaction With $CH_3°$ in the
Liquid Phase

The equation $I_A/I_M = k_{6A}^H/k_{jA}^T + (k_{6B}^H/k_{jA}^T) \cdot ([B]/[A])$ (2) served for an
experimental determination of the rate constant k, where $I_A$, $I_M$ denote
the activities of substance A and methane; $k_{6A}^H = \sum_i n_i k_i^H$ ; $k_{6B}^H = \sum_1 n_1 k_1^H$.
The authors determined (1) $k_{6A}^H/k_{jA}^T$, where $CH_3°$ was generated only in A;
(2) $k_{6B}^H/k_{6A}^H$ by generating $CH_3°$ in a mixture of A and B; (3) $k_{6B}^H/k_{jA}^T$,
where a concentration ratio $[A] \ll [B]$ was chosen for a high activity of A.
First, the authors carried out the reaction between non-tagged n-heptane,
benzene, and toluene on the one hand, and tagged cyclohexane on the other.
The values for the reaction of $n-C_7H_{14}$ with $C_6H_{12}$ are given in Table 1.
For saturated hydrocarbons $k_{hept}^H/k_{cyc.hex}^H$ is independent of the composi-
tion of the mixture. In the systems $C_6H_6 - C_6H_{12}$ and $C_6H_5 \cdot CH_3 - C_6H_{12}$
it was found that the quotients of k depended largely on the composition
of the mixture (Figs. 1,2). Hence, a second experimental series was

Card 2/4

83903

*11. 1210*
*5.3200*

AUTHORS:      Antonovskiy, V. L., Berezin, I. V., and Shevel'kova, L. V.

TITLE:        The Relative Reactivity of the C-H and C-T Bonds of
              n-Heptane, Benzene, Toluene, Ethylbenzene, and Cyclohexane
              in the Interaction With $CH_3$· in the Liquid Phase

PERIODICAL:   Doklady Akademii nauk SSSR, 1960, Vol. 134, No. 3,
              pp. 621-624

TEXT:  The authors determined the rate constants k of the reactions of the
C-H and C-T bonds on the following assumptions: In a system consisting
of two organic compounds A and B, A has the number r of types of reactive
C-H bonds, the bond of type j being tagged with tritium. Compound B is
not tagged and has p types of C-H bonds. The total number of C-H bonds
is assumed to be n. In this system, free methyl radicals are produced
by thermal decomposition of benzoyl peroxide at 55° or 85°C. Equation (1)
is written down for the composition $[CH_4]/[CH_3T]$ of methane which was
formed according to the reaction equation $RH(T) + CH_3 \longrightarrow R· + CH_4(CH_3T)$.

Card 1/4

The Use of Tritium for Determining the Relative
Rate Constants of the Cleavage of Hydrogen
Atoms of Organic Compounds. The Reactivity
of the Carbon - Hydrogen Bonds of n-Heptane

81576
S/076/60/034/06/21/040
B015/B061

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova
(Moscow State University imeni M. V. Lomonosov)

SUBMITTED: August 15, 1958

Card 3/3

81576

The Use of Tritium for Determining the Relative S/076/60/034/06/21/040
Rate Constants of the Cleavage of Hydrogen Atoms B015/B061
of Organic Compounds. The Reactivity of the
Carbon - Hydrogen Bonds of n-Heptane

activity of methane and heptane (Fig. 2), are described. Measurements
(Table 2) show that the by-reactions of the formation of methane can be
neglected. The values of the rate constants of the reaction of the
methyl radical with the C-T bond (calculated according to equation (10))
are given, as are the experimental values for the n-heptanes at $55^\circ$ to
$85^\circ C$ (Table 3) in positions 1, 2, 3, and 4 substituted by tritium.
O. B. Mesineva took part in some experiments. It was established that
all secondary C-T bonds of n-heptane show practically the same reactivity
in the temperature range $10\text{-}220^\circ C$ (Table 4). The primary C-T bonds have,
in the temperature range $55\text{-}85^\circ C$, a reactivity 10 to 12 times smaller
than the secondary C-T bonds. $k^H/k^T = 0.20\ e^{3400/RT}$ was obtained for the
hydrogen-tritium kinetic isotopic effect of the secondary bonds, which
agrees with the corresponding value for cycloheptane (Ref. 26). A. N.
Bashkirov, V. I. Vedeneyev, and V. V. Voyevodskiy are mentioned in the
text. There are 4 figures, 4 tables, and 26 references: 8 Soviet,
15 American, 1 British, and 1 German.

Card 2/3

S/076/60/034/06/21/040
B015/B061

5.3200

AUTHORS:   Antonovskiy, V. L., Berezin, I. V. (Moscow)

TITLE:   The Use of Tritium for Determining the Relative Rate Con-
stants of the Cleavage of Hydrogen Atoms of Organic Compounds.
The Reactivity of the Carbon – Hydrogen Bonds of n-Heptane

PERIODICAL:   Zhurnal fizicheskoy khimii, 1960, Vol. 34, No. 6,
pp. 1286-1293

TEXT:   In an introductory discussion, equations are derived for the
determination of the dependence of the rate constants of hydrogen
(tritium) cleavage to the element-hydrogen bond of a single, or different
organic compounds. The results of the tests on the size of the relative
rate constants of the cleavage of tritium atoms by methyl radicals for
all types of n-heptane bonds, are also given. The production of methyl
radicals took place through the thermal decomposition of acetyl peroxide
in heptane (Fig. 1, ampule). The production technique of heptanols and
bromphenols, marked with tritium (Table 1, properties), and the apparatus
used for separating the reaction products and determining the specific

Card 1/3

Reactivity of Toluene Bonds in the Inter-
action With Free Methyl Radicals

87537

S/079/60/030/012/023/027
B001/B064

There are 1 table and 3 references: 2 Soviet and 1 US.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State
University)

SUBMITTED: January 26, 1960

Card 3/3

87537

Reactivity of Toluene Bonds in the Inter-
action With Free Methyl Radicals

S/079/60/030/012/023/027
B001/B064

constant for the separation of the hydrogen atoms from the toluene molecule
(Ref.2). Since $K_\sigma^H$ is independent of the character of tagging, it is
possible to determine by this formula the ratio between the rate constants
of the reactions of the methyl radical with C - T bonds in different
positions. The relative rate constants, the differences of the activity
energies, and the ratio of the factors of the exponential function, the
separation reactions of the tritium atoms and hydrogen on different bonds
of the toluene molecule by free methyl radicals were determined. It was
shown that the growth of the methane activity forming in the interaction
of methyl and toluene, which is tagged with tritium in the cycle, is due
to the addition of methyl to the $\pi$-bonds and the formation of products
containing mobile tritium atoms. The following data are listed:

| tagged with T | $K_i^T/K_n^T$ at $85°C$ | $\Delta E = E_i^T - E_{CH_3}^H$ (cal/mole) | $A_i^T/A_{CH_3}^H$ |
|---|---|---|---|
| ortho- | 0.76 | 4750±100 | 1±0.15 |
| meta- | 0.22 | 7900±250 | 23±8 |
| para- | 1 | 4800±100 | 1.4±0.12 |
| $CH_3$ group | 156 | 2200±100 | 1.8 |

Card 2/3

87537

5.4300     1273  1160  12 42     S/079/60/030/012/023/027
B001/B064

AUTHORS:      Berezin, I. V., Kazanskaya, N. F., and Martinek, K.

TITLE:        Reactivity of Toluene Bonds in the Interaction With Free
              Methyl Radicals

PERIODICAL:   Zhurnal obshchey khimii, 1960, Vol. 30, No. 12, pp.4092-4093

TEXT:   The authors investigated the reactivity of tritium atoms in
different positions in the toluene molecule, in the reaction of the latter
with free methyl radicals. The reaction proceeded by thermal decomposition
of acetyl peroxide in a medium of toluenes tagged with tritium, at a
temperature between 60-96°C (Ref.1). The methane formed was separated
from the other reaction products and toluene, pumped into the counter,
where its radioactivity was determined. The specific radioactivity of the
toluene used in the experiments was determined in the same counter. The
radioactivity of the toluene used for the experiments has the following

ratio: $I_m/I_{tol} = K_i^T/K_\sigma^H$ , where $K_i^T$ = the constant for the velocity with

which the $CH_3$ radical separates tritium in the position i; $K_\sigma^H$ = the total

Card 1/3

BEREZIN, I.V., RAGIMOVA, A.M.

Intermediate reactions of ketones in the liquid-phase
oxidation of octadecane. Dokl.AN Azerb.SSR 16 no.1:19-22
'60.                                              (MIRA 13:6)

1. Moskovskiy gosudarstvennyy universitet im. Lomonosova.
Predstavleno akad. AN Azerbaydzhanskoy SSR M.F. Nagiyevym.
   (Ketones)  (Octadecane)   (Oxidation)

The problem of determining the...

31549
S/081/61/000/022/020/076
B102/B108

$k_p'' = k_n''/k_o''$, $k_n'/k_n'' = k_o'/k_o'' \cdot k_p'/k_p''$, where $k_o'/k_o'' = \lambda$ is known.
Under certain assumptions the authors find the relation
$k_n'/k_n'' = \lambda \sigma_R' \sigma_{R''H}/\sigma_{R'H} \sigma_{R'} \exp[-(D_{R''H} - D_{R'H})/RT]$ by expressing the
equilibrium constants through the statistical partition function. When
the number of symmetries $\sigma$ equals unity, $k_n'/k_n'' = A_o'/A_o'' \exp[-(E_n' - E_n'')/RT]$,
where $E_n' - E_n'' = E_o' - E_o'' + D' - D''$. The reaction of toluyl radicals of
various structures with $CH_3T$ is given as an illustrating example.
[Abstracter's note: Complete translation.]

Card 2/2

*II. 1510*

AUTHORS: Berezin, I. V., Kazanskaya, N. F.

TITLE: The problem of determining the relative reactivity of free radicals

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 22, 1961, 146, abstract 22Zh35 (Sb. nauchn. rabot. In-t Fiz.-organ. khimii AN BSSR, no. 8, 1960, 88-92)

TEXT: The determination of the reactivity of two radicals in the reactions $R' \cdot + HX \underset{k_0'}{\overset{k_n'}{\rightleftarrows}} R'E + X \cdot$ and $R'' \cdot + HX \underset{k_0''}{\overset{k_n''}{\rightleftarrows}} R''H + X \cdot$ leads to the determination of the ratio $k_n'/k_n''$. Usually, the ratio of the reaction rate constants of the inverse processes is easily found. The problem is reduced to finding $k_n'/k_n''$ from the known ratio $k_0'/k_0''$. Since the equilibrium constants of these processes are $k_p' = k_n'/k_0'$ and

Card 1/2

The oxidation of cyclohexane

S/595/60/000/000/004/014
E196/E535

included which gives yields of acid and ketone for the various
methods of oxidation. A mathematical analysis of the reaction
is made on the assumption that it is a simple chain reaction
with a single intermediate and a single final product, the chain
is assumed to be broken by recombination of the free radicals.
Academicians B. A. Kazanskiy, G. S. Landeberg and N.N Semenov
are mentioned in the paper. There are 10 figures and 2 tables.

| Test | Depth of oxidation | Yield of acid,% | Yield of ketone,% | Table |
|---|---|---|---|---|
| Autooxidation | 14.8 | 30 | 37 | |
| Oxidation with St$_2$Co | 18.5 | 58 | 23 | |
| Oxidation with NO$_2$ | 19 | 57 | 22 | |
| Oxidation with St$_2$Co + NO$_2$ | 22 | 51.5 | 27 | |

Card 5/5

The oxidation of cyclohexane

S/595/60/000/000/004/014
E196/E535

the catalyst (0.06 to 0.00023 mol %) showed that the higher the
amount of catalyst, the faster the rate of reaction, demonstrating
that, in the initial periods, it is a chain reaction whose rate
of initiation is proportional to the concentration of dissolved
catalyst. Similar results were obtained using cobalt adipate.
The catalyst has thus two functions - initiation of the reaction
and regulation of the proportions of the products. The rate of
absorption of oxygen in the uncatalyzed reaction remains
constant after the induction period; in the catalyzed reaction
it rises to a maximum and then decreases to a constant value which is
less than that of the uncatalyzed reaction. This suggests a
self-delaying action. To confirm this supposition the catalyst
was removed from the reaction zone some time after initiation
and the final constant velocity attained was found to be higher
than for the uncatalyzed reaction. A new method of stimulating
liquid phase oxidation, using $NO_2$, was studied. The air was
saturated with $NO_2$ (0.4%) at a rate of 50 litres/hr. At 140°C
the reaction was markedly accelerated. The method was also tried
in combination with cobalt stearate catalyst. A table is
Card 4/5

The oxidation of cyclohexane　　　　S/595/60/000/000/004/014
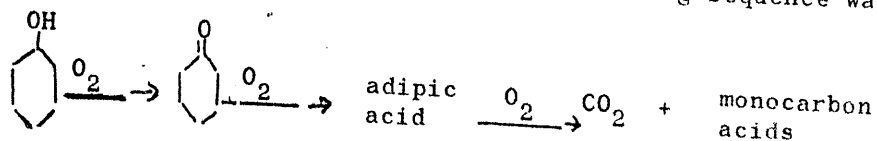　　　　　　　　　　　　　　　　　　　E196/E535

In glass vessels the hydroperoxide breaks down equally into
cyclohexanol, formed entirely by the decomposition of cyclohexyl
hydroperoxide, and cyclohexanone, from decomposition of the
hydroperoxide and oxidation of cyclohexanol.　Adipic acid is
formed exclusively by oxidation of cyclohexanone whilst the
esters are formed by direct esterification of the adipic acid
with cyclohexanol.　In a steel vessel, however, cyclohexanone
is also formed by decomposition of the cyclohexyl hydroperoxide
radical.　In the reaction with catalyzing salts, cobalt stearate
dissolved in cyclohexane was used as catalyst.　During the
reaction, the cobalt changes into the trivalent state, and after
a few minutes at 130°C the concentration of Co(III) becomes
constant, then begins to decrease until after about 1.5 hours
it is all once more in the divalent state.　With the appearance
of adipic acid the cobalt begins to precipitate as cobalt
adipate, but part of the catalyst remains in solution throughout
the reaction.　The catalyzed and non-catalyzed oxidations differ
as regards the reaction rate and concentrations of the inter-
mediate products.　Experiments with different concentrations of

Card 3/5

The oxidation of cyclohexane  S/595/60/000/000/004/014
E196/E535

saturated with water and adipic acid, which have limited
solubilities in cyclohexane. As the reaction is a chain
degradation-branching reaction, no single parameter can be used
to characterize it. The maximum absorption rate of oxygen is a
function of temperature and obeys the Arrhenius equation, with an
activation energy of 27 kcal/mol. The log of the conversion
coefficient to cyclohexyl hydroperoxide over the first part of the
reaction varied linearly with the inverse of the temperature, with
activation energy 29 kcal/mol. For the intermediate cyclohexanone,
the log maximum concentration varied linearly with the inverse of
the temperature, the activation energy being 8 kcal/mol. The
transformation of the intermediate products was studied by the
use of radioactive carbon as marker and the following sequence was
found

adipic acid $\xrightarrow{O_2}$ $CO_2$ + monocarbon acids

Card 2/5

S/595/60/000/000/004/014
E196/E535

AUTHORS:     Emanuel', N.M., Berezin, I.V. and Denisov, Ye.T.

TITLE:       The oxidation of cyclohexane

SOURCE:      Vsesoyuznoye soveshchaniye po khimicheskoy pererabotke
             neftyanykh uglevodorodov v poluprodukty dlya sinteza
             volokon i plasticheskikh mass. Baku, 1957. Baku, Izd-
             vo AN Azerb.SSR, 1960, 143-156

TEXT:        The kinetics of oxidation of cyclohexane were investi-
gated without using catalysts, with catalytic salts and with a
stimulating gaseous initiation.   The aim of this study was to
gain more information on the oxidation of cyclohexane which is
important in the production of cyclohexanone and adipic acid for
the nylon fibre industry.   A further aim was to determine the laws
governing this simple liquid phase oxidation and to apply these
laws to more complicated hydrocarbons.   Without a catalyst
satisfactory velocities can be attained at pressures of 10-100 atm
and temperatures of 135-155°C.   The main intermediate products
are cyclohexanone, cyclohexanol and cyclohexyl hydroperoxide.   A
second liquid phase appears when the reaction mixture becomes

Card 1/5

Determination of the Ratio of the Reaction Rate Con-    SOV/20-127-1-33/65
stants When Tritium Atoms in n-Heptanes Are Torn off by the Methyl Radical

reactivity of all secondary C-H bonds of the n-paraffins.
The mean constant isotope effect for the secondary CH-bonds of
n-heptane is illustrated by the relation:

$$(k^H/k^T)_{sec} = 0.20e^{-3400/RT}$$

There are 2 figures, 1 table, and 6 references, 3 of which are
Soviet.

ASSOCIATION:  Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova
              (Moscow State University imeni M. V. Lomonosov)

PRESENTED:    March 20, 1959, by N. N. Semenov, Academician

SUBMITTED:    March 11, 1959

Card 3/3

Determination of the Rat:.o of the Reaction Rate Constants SOV/20-127-1-33/65
When Tritium Atoms in n-Heptanes Are Torn off by the Methyl Radical

heptane wan measured by means of a counter. Table 1 shows the
results ob'.ained. The value of the reaction constant $k_2^T$ with
respect to the tritium detachment on the heptane 2-t was
assumed as the unit. A part of the experiments made with heptane
2-t and 3-t was supervised by O. B. Mesinova. Figures 1, 2 show

the linear dependence of the log $\dfrac{I_{CH_4}}{I_{C_7H_{16}}}$ on the absolute

temperature with respect to heptane 1-t, 2-t, and 3-t. The
constant values for $k_1^T/k_2^T$ prove the equivalence of all secondary
C-H- (C-T- resp) bonds of heptane in the temperature range of
from 10 to $220^\circ$; this is directly indicative of the uniform

Card 2/3

5(4)
AUTHORS:        Antonovskiy, V. L., Berezin, I. V.          SOV/20-127-1-33/65

TITLE:          Determination of the Ratio of the Reaction Rate Constants When
                Tritium Atoms in n-Heptanes Are Torn off by the Methyl Radical
                (Opredeleniye otnosheniy konstant skorostey otryva metil'nym
                radikalom atomov tritiya n-geptanov)

ABSTRACT:       As compared to the so very complicated reactions as are the
                oxidizing, chlorinating, sulfochlorinating processes (Refs 1-3)
                or as compared to the reaction rates in homogeneous series
                (Ref 4), the utilization of tritium offers the possibility of
                directly comparing the rate of hydrogen detachment by a free
                radical at a certain point of the compound. $CH_3$ radicals
                generated from acetyl peroxide were introduced into n-heptane,
                the $j^{th}$ CH-bond of which was marked with tritium. The methane
                thus formed was separated from the other gaseous $(CO_2, C_2H_6)$
                and liquid reaction products by traps cooled with liquid
                nitrogen. The specific activity of methane and of the marked

Card 1/3

Degenerate Branching Mechanism on Liquid-phase
Oxidation of Cyclohexane in a Steel Container                    SOV/20-126-4-33/62

The velocity of the ramification is given by the velocity of
equation 2, which practically proceeds from left to right. If,
however, there are by-reactions, the velocity of ramification
is smaller than the velocity of oxidation of cyclohexanone.
The velocity of oxidation of cyclohexanone is, according to the
above considerations, of second order which is in good agreement
with experimental data. The small value of the experimentally
found activation energy (24 kcal per mol) agrees well with the
character of the elementary reaction. There are 2 figures,
1 table, and 10 references, 8 of which are Soviet.

ASSOCIATION:  Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova
              (Moscow State University imeni M. V. Lomonosov)

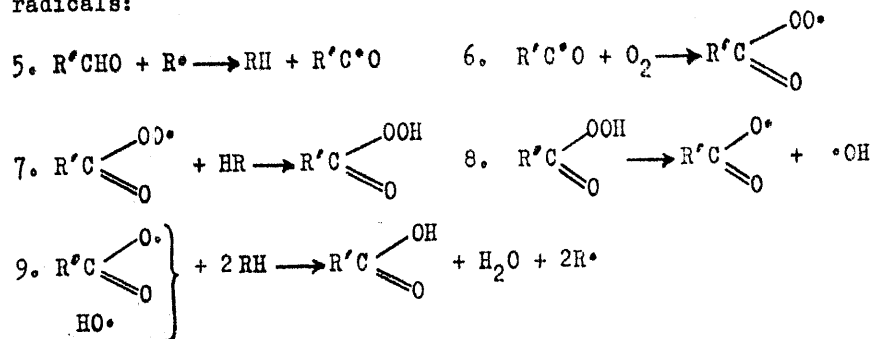PRESENTED:    January 29, 1959, by N. N. Semenov, Academician

SUBMITTED:    January 27, 1959

Card 4/4

acylhydroperoxide, which decomposes at once, thus forming 2 new radicals:

5. $R'CHO + R\bullet \longrightarrow RH + R'C\bullet O$      6. $R'C\bullet O + O_2 \longrightarrow R'C\diagup^{OO\bullet}_{\diagdown O}$

7. $R'C\diagup^{OO\bullet}_{\diagdown O} + HR \longrightarrow R'C\diagup^{OOH}_{\diagdown O}$      8. $R'C\diagup^{OOH}_{\diagdown O} \longrightarrow R'C\diagup^{O\bullet}_{\diagdown O} + \bullet OH$

9. $R'C\diagup^{O\bullet}_{\diagdown O} \Big\} + 2RH \longrightarrow R'C\diagup^{OH}_{\diagdown O} + H_2O + 2R\bullet$
    $HO\bullet$

The sequence of reactions 1-9 is so rapid that there are no measurable quantities of hydroperoxide of cyclohexanone, of the monoaldehyde of adipic acid and of peradipic acid in the system. As a result of all 9 equations it was found that instead of the used up radical $ROO\bullet$ three new radicals are forming which may react with oxygen:
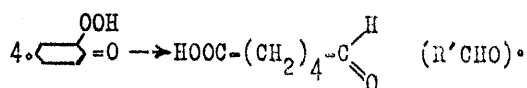
Card 3/4      10. $R\bullet + O_2 \longrightarrow RO_2\bullet$      11. $2RO_2\bullet \rightarrow$ discontinuance

specific radioactivity of the latter determined. On the basis
of the analysis results the authors suggest the following
mechanism for the reaction investigated: The molecules of cyclo-
hexanone are first attacked by free cyclohexylperoxide radicals,
thus causing that a hydrogen atom in $\alpha$-position to the keto
group of cyclohexanone is separated:

1. ⬡=O + RO$_2$° ⟶ ROOH + ⬡=O    1'. ⬡=O + HR ⟶ ⬡=O + R•
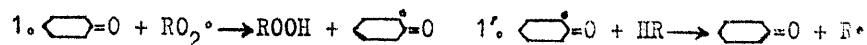
The forming keto radical forms an $\alpha$-keto hydroperoxide in
rapidly proceeding conversions, which easily decomposes whereby
monoaldehyde of adipic acid is formed (Ref 8):

2. ⬡=O + O$_2$ ⟶ ⬡=O (OO•)        3. ⬡=O (OO•) + HR ⟶ ⬡=O (OOH) + R•

4. ⬡=O (OOH) ⟶ HOOC-$(CH_2)_4$-C$\overset{H}{\underset{O}{}}$  (R'CHO)•

Card 2/4        This monoaldehyde is easily oxidized under the formation of

5(4),5(3)                                                    SOV/20-126-4-33/62

AUTHORS:      Berezin, I. V., Kazanskaya, N. F., Privalov, V. F.

TITLE:        Degenerate Branching Mechanism on Liquid-phase Oxidation of
              Cyclohexane in a Steel Container (O mekhanizme vyrozhdennykh
              razvetvleniy pri zhidkofaznom okislenii tsiklogeksana v
              stal'nom sosude)

ABSTRACT:     The authors investigated the oxidation process of cyclohexanone
              during oxidation of cyclohexane in the liquid phase. The care-
              fully purified cyclohexane was oxidized with air under a pres-
              sure of 10 atmospheres at $142^\circ$, $150^\circ$ and $157^\circ$ in a steel contai-
              ner. In the reaction mixture, cyclohexanone, cyclohexanol and
              hydroperoxide cyclohexyl were analyzed quantitatively (Ref 2).
              The kinetic curves of the products of oxidation at $150^\circ$ and
              those of cyclohexanone are given in figure 1 at all three
              temperatures investigated. After a certain time cyclohexanone
              was added to oxidizing cyclohexane the former of which was
              marked by radioactive carbon in the carbonyl group. Subsequently
              samples of oxidized cyclohexane were taken and after precipi-
Card 1/4      tation of cyclohexanone as 2,4-dinitro phenylhydrazone the

The Sequence of the Formation of Products in the Case of   SOV/2o-126-3-38/69
the Liquid Acidification of Cyclohexane in Steel Vessels

ments were carried out in a steel vessel at $140^\circ C$ and at a
pressure of 10 at, and figure 1 shows the curve of the products
in dependence on time. A further diagram (Fig 2) shows the
variation with respect to time of molar activity, and table 1
shows the rate of the formation of alcohol at various points
of time. Finally, the obtaining of cyclohexanyl is briefly
discussed. There are 2 figures, 1 table, and 10 references,
6 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova
(Moscow State University imeni M. V. Lomonosov)

PRESENTED:   Janaury 29, 1959, by N. N. Semenov, Academician

SUBMITTED:   January 27, 1959

Card 2/2

SOV/20-126-3-38/69

5(4)
AUTHORS: Berezin, I. V., Kazanskaya, N. F.

TITLE: The Sequence of the Formation of Products in the Case of the Liquid Acidification of Cyclohexane in Steel Vessels (Posle-dovatel'nost' obrazovaniya produktov pri zhidkofaznom okis-lenii tsiklogeksana v stal'nom sosude)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 126, Nr 3, pp 594 - 597 (USSR)

ABSTRACT: It is said in the introduction that the essential part of the products of the acidification of hydrocarbons is formed by the decomposition of hydrogen peroxide. A scheme is given of a possible acidification of cyclohexane in the liquid state, after which a method is suggested for the synthesis of a radioactive hydrogen peroxide of cyclohexyl. This method is explained on the basis of the aforementioned scheme. The general radioactivity of the product is given in formula (1) as a function of molar radioactivity, and by formula (2) the time-dependent variation of radioactivity is given. From these formulas, formula (5) is then developed for the rate at which the molar radioactivity of cyclohexane increases. The experi-

Card 1/2

On the Problem of the Mechanism Underlying the Rupture     05839
of the C-C Bond in the Liquid-phase Oxidation of n-Heptane by Molecular Oxygen    SOV/76-33-10-37/45

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova
(Moscow State University imeni M. V. Lomonosov)

SUBMITTED: April 3, 1958

Card 3/3

On the Problem of the Mechanism Underlying the Rupture of the C-C Bond in the Liquid-phase Oxidation of n-Heptane by Molecular Oxygen

05839
SOV/76-33-10-37/45

heuvel (Ref 10), using a silica gel prepared according to Ramsay (Ref 11). The following acids were obtained: formic acid, acetic acid, propionic acid, butyric acid and valeric acid. Two layers were formed during the oxidation: an upper hydrocarbon layer and a lower layer of aqueous acid. Thus, analysis was complicated (Table: distribution of the oxidation products in the two layers).The authors plotted the kinetic curves of the accumulation of reaction products according to the reacting groups as well as of the accumulation of the various acids. Besides, experiments were made with the addition of butyric acid and butyric aldehyde (Figs 1-6). The ratio of acids remains fairly constant during the oxidation: $C_2 + C_1 : C_3 : C_4 : C_5 = 8:4:3:1$.

The aldehydes were practically completely transformed into acids at a high velocity. It was found that the reaction mechanism underlying the rupture of the C-C bond during the liquid-phase oxidation of hydrocarbons, suggested in publications, may fully explain the ratio of the resultant acids. There are 7 figures, 1 table, and 12 references, 5 of which are Soviet.

Card 2/3

05839
SOV/76-33-10-37/45

5(4)
AUTHORS:     Berezin, I. V., Makalets, B. I.

TITLE:       On the Problem of the Mechanism Underlying the Rupture of the
             C-C Bond in the Liquid-phase Oxidation of n-Heptane by Molecular
             Oxygen

PERIODICAL:  Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 10,
             pp 2351 - 2357 (USSR)

ABSTRACT:    It is still unknown how far and at which velocity the aldehydes
             formed by liquid-phase oxidation of hydrocarbons oxidize to form
             acids at different temperatures. Data on the behavior of acids
             in the medium of oxidizing n-alkanes are also scarce. Since
             there are also several incompatible data, the authors investi-
             gated the kinetic behavior of the acids formed by liquid-phase
             oxidation of n-heptane. Oxidation was carried out in an auto-
             clave with continuous flow for 4-5 hrs (Ref 5) at 140-150°, 33
             atm, a flow velocity of air of 32.6 l/min per one liter of
             heptane. 3-5 samples were taken out in this time. A method by
             Wheeler (Ref 6) was used for the extraction of the peroxide;
             the acids were extracted according to Raine and Garner (Ref 9)
             and subjected to chromatographic treatment according to Vanden-

Card 1/3

SOV/80-32-4-53/47

The Oxidation of a Mixture of Cyclohexane and Cyclohexanol Into Adipic Acid

in the "anol head".  The process of oxidizing "anol head" is to
be carried out with continuous removal of adipic acid obtained in
order to prevent its burning into lower dicarboxylic acids, and
the process thereby acquires a  continuous character.
There are 3 sets of graphs and 7 Soviet references.

SUBMITTED:   November 1, 1957

Card 2/2

5(3)

AUTHORS: Berezin, I.V., Denisov, Ye.T., Suvorova, S.N., Smolyan, Z.S. and Emanuel, N.M.

TITLE: The Oxidation of a Mixture of Cyclohexane and Cyclohexanol to Adipic Acid (Okisleniye smesi tsiklogeksana i tsiklogeksanola v adipinovuyu kislotu)

PERIODICAL: Zhurnal prikladnoy khimii, 1959, Vol 32, Nr 4, pp 888-892 (USSR)

ABSTRACT: Production of monomers for plastics and synthetic fibers is one of the important tasks of modern chemistry. The utilization of various waste materials can contribute to the solution of this task. One of these waste materials is the mixture of cyclohexane, 80 mol.%, and cyclohexanol, 20 mol.%. The authors studied the kinetics of the oxidation of this mixture, called "anol head", with an aim of obtaining cyclohexane and adipic acid. The oxidation was carried out in an autoclave at a pressure of 20 atm by mole- cular oxygen at temperatures of 130 and 150°C. Kinetic curves of accumulation of the reaction products were obtained and the possibility of producing adipic acid by oxidizing the "anol head" was proven. It was shown that some peculiarities in the oxidation kinetics were determined wholly by the concentration of cyclohexanol

Card 1/2

BEREZIN, I.V.; RAGIMOVA, A.M.

Studying the reactions of certain intermediate products in the
process of liquid phase oxidation of octadecane. Dokl.AN
Azerb.SSR 15 no.11:1015-1017 '59.          (MIRA 13:4)

1. Moskovskiy gosudarstvennyy universitet. Predstavleno
akademikom AN Azerbaydzhanskoy SSR M.F.Nagiyevym.
        (Esterification)  (Decanoic acid)

BEREZIN, I.V.; RAGIMOVA, A.M.

Formation of esters during liquid-phase oxidation of octadecane.
Dokl. AN Azerb. SSR 15 no.9:815-819 '59. (MIRA 13:2)

1.Kafedra khimicheskoy kinetiki Moskovskogo gossudarstvennogo universiteta imeni Lomonosova. Predstavleno akademikom AN Azerbaydzhanskoy SSR M.F. Nagiyevym.

(Octadecane)

BEREZIN, I.V.; RAGIMOVA, A.M.

Behavior of fatty acids in the process of liquid-phase oxi-
dation. Dokl.AN Azerb.SSR 15 no.3:219-223 '59.

(MIRA 12:5)
1. Moskovskiy gosudarstvenny universitet im. M.V. Lomonosova.
Predstavleno akademikom AN AzerSSR M.F.Nagiyevym.
(Acids, Fatty) (Oxidation)

BEREZIN I.V.

SOV/55-59-3-29/32

21(8) 5(0)

AUTHOR: Lapitskiy, A.V.

TITLE: The First All-Union Conference of Universities and Colleges on Radiochemistry

PERIODICAL: Vestnik Moskovskogo universiteta. Seriya matematiki, mekhaniki, astronomi, fiziki, khimii, 1959, Nr 3, pp 221-223 (USSR)

ABSTRACT: This conference was convened by the initiative of the laboratoriya radiokhimii khimicheskogo fakul'teta MGU (Laboratory of Radiochemistry of the Department of Chemistry of Moscow State University) and was held in Moscow from April 20 to April 25, 1959. It was attended by professors, teachers, and scientific collaborators of 32 universities and colleges of the Soviet Union. In his opening address, An.N.Nesmeyanov, Doctor of Chemical Sciences, stressed the importance of Radio-chemistry. 30 lectures were delivered by members of Moscow State University.

Card 1/4

Card 2/4

Card 3/4

Paraffin Oxidation Initiated by Chlorine During the Initial Stage of the Reaction

SOV/80-59-1-28/44

curves of acid formation is due to the presence in "Küpsen"-type paraffin of aromatic substances. There are 8 graphs, 1 diagram and 4 Soviet references.

SUBMITTED: December 20, 1956

Card 2/2

AUTHORS:     Berezin, I.V., Vagner, G. and Emanuel', N.M.

TITLE:       Paraffin Oxidation Initiated by Chlorine During the Initial
             Stage of the Reaction                 (Okisleniye parafina, in-
             itsiirovannoye khlorom v nachal'nyy period razvitiya reaktsii)

PERIODICAL:  Zhurnal prikladnoy khimii, 1959, Nr 1, pp 173-180 (USSR)

ABSTRACT:    The method of stimulating liquid-phase oxidation reactions by
             means of small admixtures to the air of certain catalyzing
             gases (NO$_2$, HBr, etc) was named the method of gas initiation
             [Ref. 1]. The present investigation was aimed at establish-
             ing main regularities of the initiation effect caused by ad-
             mixtures of chlorine in the oxidation process of lignite para-
             fin of the "Köpsen" type (East Germany). As the main pro-
             ducts of oxidation are aliphatic acids, the principal atten-
             tion was paid to the kinetics of their formation and ac-
             cumulation. The results of experiments are presented in
             graphical form. It can be concluded that the gas initiation
             of the reaction by chlorine has a strong stimulating effect
             on the paraffin oxidation process; at that the initiation
             is brought about during a short initial period in the de-
             velopment of the process. The accumulation of acids is de-
             scribed by the kinetic curves obtained experimentally. It
             was established that the low maximum effect in the kinetic

Card 1/2

Berezin I.V.

A Method of the Quantitative Analysis of Cyclohexanone and Cyclohexanol    SOV/ 76-32-6-5/46
in Oxidation Products of Cyclohexane by Means of Infrared Absorption Spectra

ASSOCIATION:    Moskovskiy gosuniversitet im. M. V. **Lomonosova**
                (Moscow State University imeni M. V. Lomonosov)

SUBMITTED:      September 14, 1956

1. Cyclohexanones--Quantitative analysis   2. Cyclohexanols--Quanti-
tative analysis   3. Cyclohexanes--Reduction   4. Infrared spectrum

Card 3/3

A Method of the Quantitative Analysis of Cyclohexanone and Cyclohexanol
in Oxidation Products of Cyclohexane by Means of Infrared Absorption Spectra

SOV/ 76-32-6-5/46

tion of the concentration of the substances was conducted
according to the law by Lambert-Beer, employing the ex-
tinction coefficient. At higher concentrations of alcohol
the sample had to be diluted. A comparison of the results
obtained with that of other methods showed that the determina-
tion is not disturbed by the presence of peroxides. On the
other hand, a ketone is present in the sample, the cyclo-
hexanone. The presence of other oxidation products does not
disturb its determination. A hydration is proposed in order
to prevent an increase of the results caused by the influence
of substantial amounts of esters and acids. In order to be
able to determine the ester content, the extinction coef-
ficient of the carbonyl band was approximately determined,
as well as of the mono- and dicyclohexyl esters of adipic
acid. The analysis as to contents of ketones and esters in
the oxidation mixture can only be conducted at optical densi-
ties below 0.3, where the spectral bands separate from each
other, in case they are present simultaneously. There are
5 figures, 4 tables, and 8 references, 4 of which are Soviet.

Card 2/3

AUTHORS:  Berezin, I. V., Kazanskaya, N. F., Meluzova, G. B.      SOV 76-32-6-5/46

TITLE:  A Method of the Quantitative Analysis of Cyclohexanone and Cyclohexanol in Oxidation Products of Cyclohexane by Means of Infrared Absorption Spectra (Metod kolichestvennogo analiza tsiklogeksanona i tsiklogeksanola v produktakh okisleniya tsiklogeksana po spektram pogloshcheniya v infra-krasnoy oblasti)

PERIODICAL:  Zhurnal fizicheskoy khimii, 1958, Vol. 32, Nr 6, pp.1218-1225 (USSR)

ABSTRACT:  A method of analysis serving in a number of kinetic investigations was developed. An infrared spectrometer of the type IKS-1 with automatic recording equipment EPP-09 and with cuvettes of special construction was used. A description of the apparatus and a schematic figure are given. By making use of the different intensity of the spectral bands the analysis could be conducted in such a way as to determine ketone and alcohol in the same cuvette, which is important because of the small amount of sample substance. The determina-

Card 1/3

Mechanism of the Oxidation of the Acids With
Molecular Oxygen

SOV/79-28-10-19/60

at the $\beta$ -carbon atom. In the decarboxylation of the acid a
methyl ketone is formed that has one carbon atom less than
the acid. The oxidizability of the acid depends on its
structure. The acetic acid is practically inert. The yield
of the n-valeric acid activated with radioactivated carbon
in the $\alpha$ -position amounted to 23 %. There are 1 table and
9 references, 3 of which are Soviet.

ASSOCIATION:    Moskovskiy gosudarstvennyy universitet
(Moscow State University)

SUBMITTED:    August 8, 1957

Card 3/3

Mechanism of the Oxidation of the Acids With

Molecular Oxygen

of the acid molecules. As the acids are not only used up in the reaction process but also are formed as such as a consequence of the oxidation of hydrocarbon, the favorable solution of this problem consists of employing the method of isotopic indicators. A simple method was chosen that made the analytical part of the work considerably easier, i. e. the oxidation of n-butyric and n-valeric acid in n-heptane medium. To observe the behaviour of the functional group as well as that of the hydrocarbon chain of the acid an n-butyric acid with radioactivated carbon in the carboxyl, and an n-valeric acid radioactivated in the $\alpha$-position were synthesized. Moreover, an acetic acid was produced that was radioactivated in the carboxyl in order to prove its oxidizability under the conditions given. Concluding, the following results are mentioned: The acids are subjected to a quantitative decarboxylation in the medium of the oxidizing hydrocarbon. In the activation of the carboxyl with radioactivated carbon $CO_2$ is the only active gaseous reaction product. According to this separated gas the behaviour of the acid carboxyl in any complex system of the oxidation products of hydrocarbons can be classified. The oxidizing reagent attacks the acid molecule

Card 2/3

AUTHORS:        Berezin, I. V., Makalets, B. I.,        SOV/79-28-10-19/60
                Chuchukina, L. G.

TITLE:          Mechanism of the Oxidation of the Acids With Molecular Oxygen
                in the Modium of n-Heptane (Mekhanizm okisleniya kislot
                molekulyarnym kislorodom v srede n-geptana)

PERIODICAL:     Zhurnal obshchey khimii, 1958, Vol 28, Nr 10, pp 2718-2723
                (USSR)

ABSTRACT:       From the papers known on the oxidation of acids with bound
                and air oxygen in the presence of catalysts (Refs 1-4) it may
                be seen that the oxidation mechanism of the acids depends on
                the conditions of the experiments. Therefore the rules
                governing the oxidation of the single acids in the presence
                of catalysts with different oxidizing agents may not be
                extended without earlier examination to the case where the
                oxidation of the acids takes place in the medium of an
                oxidizing hydrocarbon. It was of interest to the authors to
                investigate the chemical nature of the oxidation of acids in
                this respect, to compare it with data in publications and thus
                to discover the fundaments of the oxidation mechanism in
        Card 1/3        dependence on the character of the reaction and the structure

SOV/75-13-4-19/29

The Determination of the Ketones, Esters, and Acids in the Products of the
Oxidation of Paraffin Hydrocarbons in the Liquid Phase by Means of the Meas-
uring of the Absorption Spectra in the Infrared Range

ASSOCIATION:   Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova
               (Moscow State University imeni M. V. Lomonosov)

SUBMITTED:  .   May 16, 1957

               1. Ketones--Determination   2. Esters--Determination
               3. Acids--Determination   4. Organic compounds--Spectra
               5. Infrared spectroscopy

Card 4/4

SOV/75-13-4-19/29

The Determination of the Ketones, Esters, and Acids in the Products of the
Oxidation of Paraffin Hydrocarbons in the Liquid Phase by Means of the Measuring of the Absorption Spectra in the Infrared Range

$\pm$ 3 cm$^{-1}$, and that of carboxylic acids is at a frequency of
1713 $\pm$ 2 cm$^{-1}$. The extinction coefficients and the contours
of the bands were measured for individual substances and for
mixtures of compounds with a carbonyl group (by means of an
apparatus of the type IKS-11, and automatic recorders of the
type EPP-09 (Ref 3)). The influence exerted by the mixing of
the frequencies of the components on the extinction coefficient of the absorption bands of the mixture was explained.
Also the correction values and the extinction coefficients in
mixtures of ketones, esters, and acids were found. Furthermore
methods for the removal of the acids are described by which
fact the accuracy of the determination of ketones and esters
is increased. The whole complex of problems is dealt with in
detail. N. K. Man'kovskaya supplied samples of oxidized paraffin and of acids for the experiments. This is acknowledged by
the authors. There are 2 figures, 6 tables, and 13 references,
7 of which are Soviet.

Card 3/4

The Determination of the Ketones, Esters, and Acids in the Products of the SOV/75-13-4-19/29
Oxidation of Paraffin Hydrocarbons in the Liquid Phase by Means of the Meas-
uring of the Absorption Spectra in the Infrared Range

which conditions must be met in the kinetic investigations as
well as in the practical work of the oxidation of high molec-
ular paraffin hydrocarbons. Substances of different origin were
used for taking the spectra: acetone, methyl-ethyl ketone, di-
butyl ketone, ethyl acetate, amyl acetate, butyric acid, stearic
acid, stearone (synthesized according to Ref 5), methyl stearate;
further a mixture of synthetic fatty acids of different com-
position which mainly consisted of not ramified carboxylic
acids, and which had been obtained by the oxidation of a mix-
ture of high molecular paraffins (at the SZHK Kombinat at
Shebekino), methyl esters of the synthesized acids, esters of
the synthesized fatty acids with the alcohol $C_{13}$, as well as a
mixture of ketones with a mean molecular weight of 249. It was
found that ketones and esters may be quantitatively deter-
mined in mixtures of oxidation products in paraffins on the
basis of the absorption spectrum of the $>C=O$ bond. The absorp-
tion band of the keto group of aliphatic ketones is at a fre-

Card 2/4         quency of $1718 \pm 3$ cm$^{-1}$, that of esters has one of $1738 \pm$

AUTHORS:        Berezin, I. V., Meluzova, G. B.            SOV/75-13-4-19/29

TITLE:          The Determination of the Ketones, Esters, and Acids in the
                Products of the Oxidation of Paraffin Hydrocarbons in the
                Liquid Phase by Means of the Measuring of the Absorption
                Spectra in the Infrared Range (Opredeleniye ketonov, efirov i
                kislot v produktakh zhidkofaznogo okisleniya parafinovykh
                uglevodorolov po spektram pogloshcheniya v infrakrasnoy oblasti)

ABSTRACT:       The methods of the functional analysis of mixtures of oxygen-
                containing organic compounds on the basis of the absorption
                spectrum in the infrared range (Refs 1, 2) as described in
                publications have a number of disadvantages: they either have
                an insufficient accuracy or they may be used only in the ab-
                sence of carboxylic acids. The latter makes impossible the em-
                ployment of these methods in the analysis of oxidation products
                of saturated hydrocarbons, the acid content of which, as a rule
                is high. In the present paper the authors elaborate a method
                for the quantitative determination of ketones, esters, and
                acids which secures sufficient accuracy and a quick analysis,

Card 1/4

On the Determination of the Reactivity of Hydrogen Atoms in Organic Compounds. SOV/156-58-4-30/49
The Kinetic Isotope Effect of Tritium in Radical Reactions of the Cyclo-
paraffins

        at the Moscow State University imeni M. V. Lomonosov)

SUBMITTED:    April 12, 1958

Card 2/2

AUTHORS:        Antonovskiy, V. L., Berezin, I. V.        SOV/156-58-4-30/49

TITLE:          On the Determination of the Reactivity of Hydrogen Atoms in
                Organic Compounds. The Kinetic Isotope Effect of Tritium in
                Radical Reactions of the Cycloparaffins (Ob opredelenii
                reaktsionnoy sposobnosti atomov vodoroda organicheskikh
                soyedineniy. Kineticheskiye izotopnyye effekty tritiya v
                radikal'nykh reaktsiyakh tsikloparafinov)

PERIODICAL:     Nauchnyye doklady vysshey shkoly. Khimiya i khimicheskaya
                tekhnologiya, 1958, Nr 4, pp 731-735 (USSR)

ABSTRACT:       A method for the quantitative determination of the relative
                reactivity of hydrogen atoms in organic compounds was suggested.
                The relative reactivity of hydrogen atoms in cyclopentane and
                cyclohexane was determined. The kinetic hydrogen tritium
                isotope effect in the reactions $CH_3{}^\bullet$ with cyclopentane, cyclo-
                hexane and cycloheptane was measured. There are 2 tables and
                6 references, 2 of which are Soviet.

ASSOCIATION:    Kafedra khimicheskoy kinetiki Moskovskogo gosudarstvennogo
                universiteta im. M. V. Lomonosova (Chair of Chemical Kinetics
Card 1/2

SOV/156-58-2-29/48

Kinetic Isotopic Effect of Hydrogen. The Reaction of Benzene-t With the Rad-
ical of Methyl

Card 4/4

SOV/156-58-2-29/48

Kinetic Isotopic Effect of Hydrogen. The Reaction of Benzene-t With the Rad-
ical of Methyl

active radicals as $CH_x$, .OH and others which form a solid bond
with the hydrogen atom (Ref 2). The presence of substituents
exercises a considerable influence on the mechanism of stripping.
This may lead to the formation of an intermediary adduct and can
direct the reaction to the way of scheme b) (Ref 4). Methyl rad-
icals are formed in a carbonic acid solution in connection with
the decomposition of the used acetyl peroxide. Part of them
strips the hydrogen atoms and forms methane; the remaining ones
recombine with other radicals or affiliate with unsaturated
molecules amongst which is the benzene-ring. Concludingly, the
method of carrying out the experiment is described. There are
1 figure, 1 table, and 10 references.

ASSOCIATION: Kafedra khimicheskoy kinetiki Moskovskogo gosudarstvennogo
universiteta im. M. V. Lomonosova (Chair of Chemical Kinetics
of Moscow State University imeni M. V. Lomonosov)

SUBMITTED: October 29, 1957
Card 3/4

Kinetic Isotopic Effect of Hydrogen. The Reaction of Benzene-t With the Rad-ical of Methyl

takes place in a single stage by bursting of the C—H-compound which must lead to a great isotopic effect. In the present re-port, the isotopic effect was measured - as given in the title - according to the reaction $CH_3 \cdot + C_6H_6\text{-}t \longrightarrow CH_4\text{-} + C_6H_5 \cdot$, (1) at 85,00 ± 0,05°. The calculation was carried out according to the formula $\dfrac{k_n}{k_t} = \dfrac{\text{specific activity of benzene-t}}{(\text{specific activity of } CH_4\text{-}t)} \times 6$ where 6 - in-dicates the number of hydrogen atoms in the $C_6H_6$-molecule. The test-results are given in table 1. Two test-series were made with initial concentrations of acetyl-peroxide: 0.025 and 0.01 mol/l. As can be seen from table 1, the amount of the specific activity of the separated methane (and consequently also the amount of the isotopic effect) practically does not depend on the intensity of decomposition of acetyl-peroxide. The average value of the isotopic effect amounts to 6.02 ± 0.07. It hence follows that the stripping of the hydrogen atom from benzene takes place by a direct bursting of the C—H-compound according to scheme a). Such a mechanism of stripping is characteristic for such highly

Card 2/4

AUTHORS:        Antonovskiy, V. L., Berezin, I. V.          SOV/156-58-2-29/48

TITLE:          Kinetic Isotopic Effect of Hydrogen (Kineticheskiy izotopnyy
                effekt vodoroda) The Reaction of Benzene-t With the Radical of
                Methyl (Reaktsiya benzola-t s metil'nym radikalom)

PERIODICAL:     Nauchnyye doklady vysshey shkoly. Khimiya i khimicheskaya
                tekhnologiya, 1958, Nr 2, pp. 320-323 (USSR)

ABSTRACT:       The study of these effects forms the indispensable first stage
                in connection with the use of hydrogen-isotopes for the investi-
                gation of the reactivity of different C—H-compounds. Due to the
                knowledge of these effects the mechanism of the chemical reac-
                tion can also be clarified more thoroughly. The separation of
                the hydrogen atom from the aromatic nucleus by a radical at pre-
                sent is explained by means of 2 schemes (Refs 1-4): a) a direct
                stripping of the hydrogen according to which the phenyl-radical
                enters reactions which end by a radical recombination; b) first
                of all the radical R affiliates to the aromatic nucleus and
                forms the adduct I which subsequently reacts with the other rad-
                ical and forms $R-C_6H_5$ and $R'H$. The stripping of hydrogen accord-
                ing to the reaction b) need not take place under a sub-
Card 1/4        stantially isotopic effect. According to scheme a) the reaction

Investigations in the Field of the Stereochemistry of Cyclic          62-2-9/28
Compounds.

were drawn.
There are 4 tables and 10 references, 6 of which are Slavic.

ASSOCIATION:    State University imeni M.V. Lomónosov, Moscow (Moskovskiy
                gosudarstvennyy universitet imeni M.V. Lomonosova) and
                Institute for Organic Chemistry AN USSR imeni N.D. Zelinskogo
                (Institut organicheskoy khimii imeni N.D. Zelinskogo Akademii
                nauk SSSR).

SUBMITTED:      September 7, 1956

AVAILABLE:      Library of Congress

                1. Stereochemistry-Cyclic compounds   2. Lactones-Structural
                   analysis   3. Cyclic compounds-Structural analysis

Card 2/2

Berezin, I. V.

AUTHORS:      Kucherov, V. F., Berezin, I. V., Nazarov, I. N.      62-2-9/28

TITLE:        Investigations in the Field of the Stereochemistry of Cyclic
              Compounds (Issledovaniye v oblasti stereokhimii tsiklicheskikh
              soyedineniy). Report 19: Infrared Spectra of Cyclic Lactones
              (Soobshcheniye 19. Infrakrasnyye spektry tsiklicheskikh
              laktonov).

ABSTRACT:     As was already shown in a paper published earlier the method
              of infrared spectroscopy can successfully be employed for
              proving the  structure of lactones. For the purpose of the
              systematic investigation of the dependence of the infrared
              spectra on the structure of diverse polycyclic lactones the
              authors examined the spectra of the carboxyl-frequencies. They
              determined some structural regularities of the carboxyl-fre-
              quencies of this type of compounds. On the basis of the ana-
              lysis of the infrared spectra of lactones-1 and 2-methyldecal-
              ine-1, 2-dicarboxylic acids their configuration was determined
              and from it the conclusions on the stereochemistry of the diene
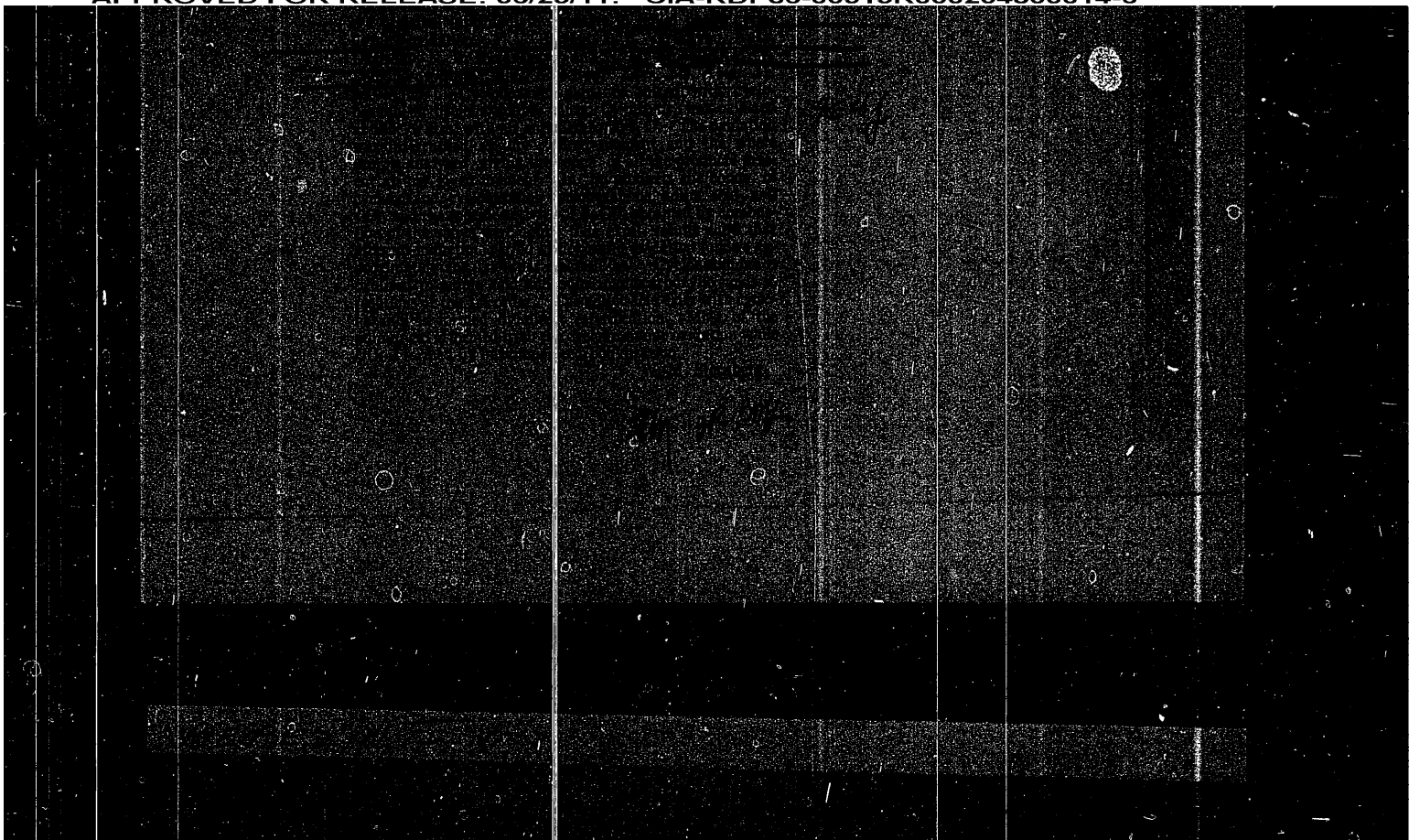Card 1/2      condensation of 1-vinyl-$\Delta$-cyclohexane with citracon anhydride
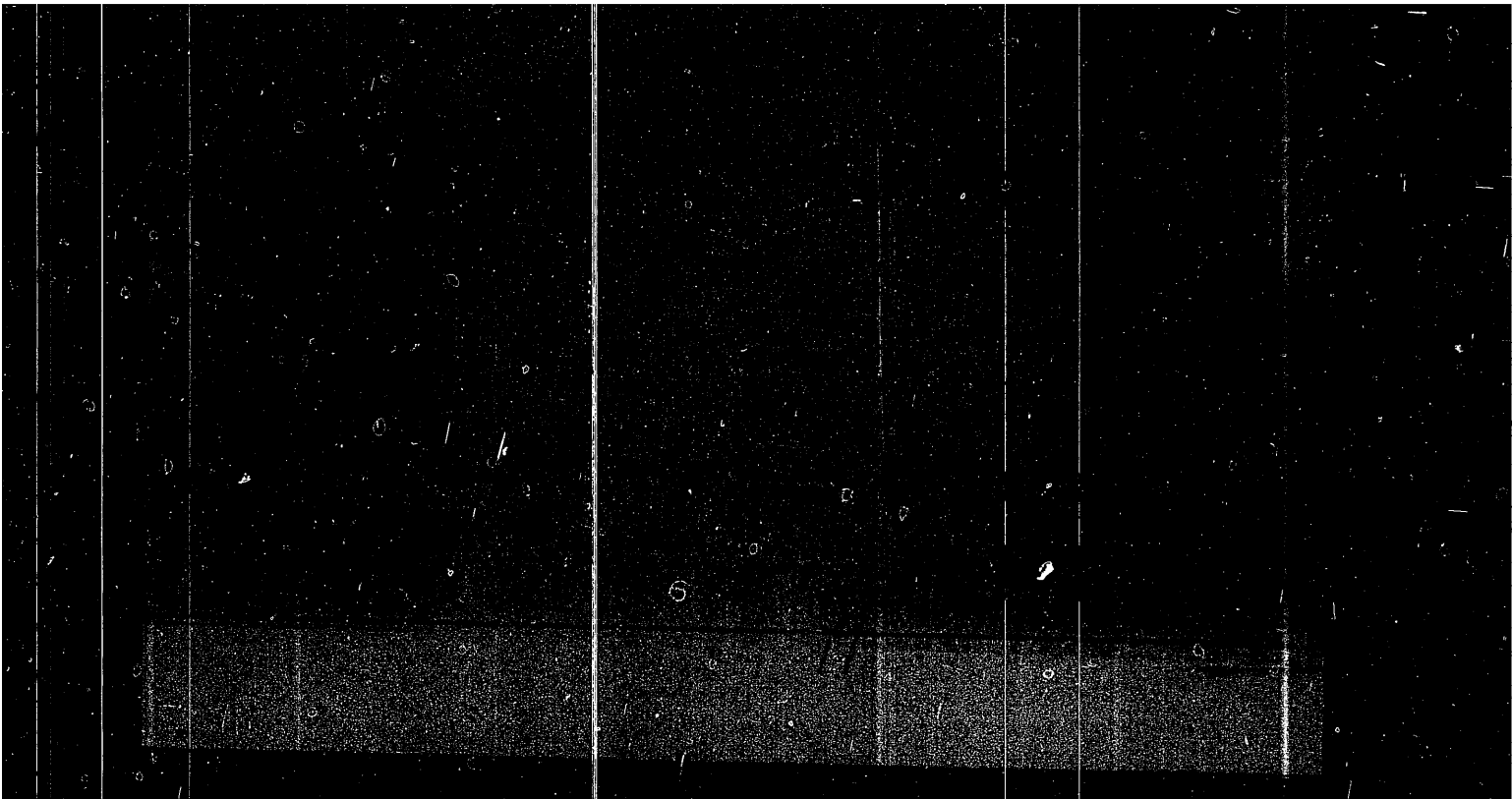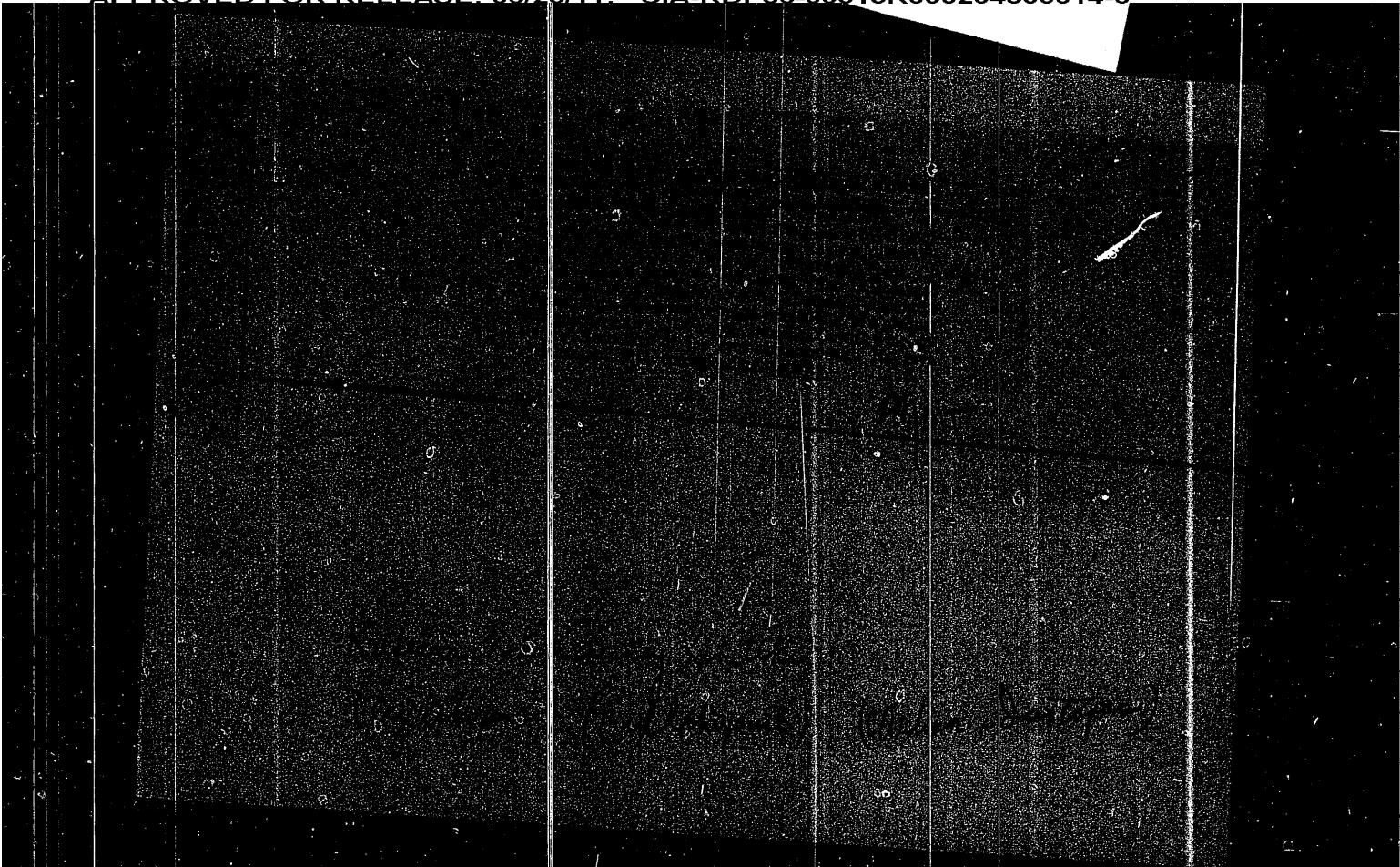
USSR/Physical Chemistry - Kinetics, Combustion, Explosions, Topo-
chemistry, Catalysis.

Abs Jour: Referat. Zhurnal Khimiya, No 3, 1958, 7210.

B-9

basically proceeds through the formation of II hydroperoxide
and its following decomposition to semialdehide of adipic acid,
which oxidizes to VII.

Card    : 4/4

-15-

USSR/Fitting Out of Laboratories - Instruments.                    H-
          Their Theory, Construction, and Use.

Abs Jour   :  Ref Zhur - Khimiya, No 3, 1957, 8649

              can be varied by the insertion of gaskets.  An apparatus
              has been constructed for measuring the thickness and ta-
              per of the cell, using the micrometer attachment of the
              microscope.  The authors are of the opinion that the
              thickness of the cell can be measured with an accuracy
              of $\pm 1\mu$ .

Card 2/2

. BEREZIN, I.V.

USSR/Fitting Out of Laboratories - Instruments.                H-
          Their Theory, Construction, and Use.

Abs Jour    :  Ref Zhur - Khimiya, No 3, 1957, 8649

Author      :  Berezin, I.V., and Meluzova, G.B.
Inst        :
Title       :  A Cell for Quantitative Spectroscopic Analysis in the
               Infrared Region and Description of Apparatus for Measuring
               the Thickness and Taper of the Cell.

Orig Pub    :  Zh. analit. khimii, 1955, Vol 10, No 4, 262-264.

Abstract    :  An infrared cell is described consisting of two crystal
               windows cemented to metal plates with Ag or Cu amalgam;
               the plates are attached to both sides of a cylinder with
               screws. Two holes fitted with ground stoppers are dril-
               led into the cylinder and are used for filling and wash-
               ing the cell. The thickness of the cell is equal to the
               distance between the windows and is determined by the
               thickness of the cylinder; the thickness of the cell

Card 1/2

BEREZIN, I.V.

USSR/Chemistry - Physical chemistry

Card 1/1    Pub. 22 - 20/45

Authors    :  Berezin, I. V.

Title      :  Certain data on the kinetics of acylation of alcohols with 3,5-dinitro-
              benzoyl chloride

Periodical :  Dok. AN SSSR 99/4, 563-564, Dec 1, 1954

Abstract   :  Data on the kinetics of acylation of certain alcohols, with various acylating
              media, are presented. Paranitro- and 3,5-dinitrobenzoyl chloride plus small
              amounts of pyridine were found to be the most active acylating media. The
              possibility of using 3,5-dinitrobenzoyl chloride for quantitative determina-
              tion of primary and secondary alcohols and mono-atomic phenols is briefly
              discussed. One USSR reference (1953). Table, graph.

Institution : The M. V. Lomonosov State University, Moscow

Presented by: Academician N. N. Semenov, July 20, 1954

BEREZIN, I. V.

USSR/Chemistry - Physical Chemistry

Card 1/1

Authors     : Berezin, I. V., and Denisov, E. T.

Title       : Basic products of liquid-phase oxidation of cyclohexane with atmospheric
              oxygen and the role of these products in processes of phase-formation

Periodical  : Dokl. AN SSSR, 97, Ed. 2, 273 - 275, July 1954

Abstract    : Two layers (upper and lower) are formed during the oxidation of cyclohexane
              with atmospheric oxygen; the upper layer represents a solution of reaction
              products in cyclohexane; the lower layer consists of liquid oxidation pro-
              ducts and a considerable amount of solid acids. Quantitative separation
              of upper layer products showed that 95 mol. % of all alcohols consisted of
              cyclohexanol and 97 mol. % of all carbonyl compounds consisted of cyclohex-
              ane. The lower layer contained the same products plus adipic and formic
              acids. Five references. Tables.

Institution : The M. V. Lomonosov State University, Moscow

Presented by : Academician N. N. Semenov, March 20, 1954

BEREZIN, Ivan Semenovich; ZHIDKOV, Nikolay Petrovich; GORYACHAYA,
M.M., red.; AKSEL'ROD, I.Sh., tekhn. red.

[Calculation methods]Metody vychislenii. Izd.2., perer.
Moskva, Fizmatgiz. Vol.2. 1962. 635 p. (MIRA 15:11)
(Numerical calculations)

PHASE I BOOK EXPLOITATION    SOV/3859

Berezin, Ivan Semenovich, and Nikolay Petrovich Zhidkov

Metody vychisleniy, t. 2 (Computation Methods, v. 2)  Moscow, Fizmatgiz,
1959.  620 p.  10,000 copies printed.

Eds.:  B. M. Budak and A. D. Gorbunov;  Tech. Ed.: N. Ya. Murashova.

PURPOSE:  This book is intended as a textbook for students in divisions
of mechanics and mathematics and of physics and mathematics who are
specializing in computational mathematics, and also for those interested
in the theory and practice of numerical methods.

COVERAGE:  The book is the second of two volumes.  The authors analyze
numerical methods of solving systems of linear algebraic equations,
equations of higher degrees, and transcendental equations.  They
also discuss numerical methods for finding eigenvalues, approximate
methods of solving ordinary differential equations, partial differ-
ential equations, and integral equations.  No personalities are
mentioned.  References are given after each chapter.

Card 1/15

Calculation Methods, Vol. 1 (Cont.)                          SOV/3962

   Assistant N. S. Bakhalov. The authors also thank Professor A. N. Tikhonov,
   Corresponding Member of the Academy of Sciences  USSR, and Docent B.M. Budak.
   References accompany each chapter.

TABLE OF CONTENTS:

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PHASE I BOOK EXPLOITATION          SOV/3982

Berezin, Ivan Semovich, and Nikolay Petrovich Zhidkov

Metody vychisleniy, t. 1  (Calculation Methods, Vol. 1)  Moscow, Fizmatgiz,
    1959.  464 p.   20,000 copies printed.

Eds.:  B. M. Budak and A. D. Gordunov.

PURPOSE:  This textbook is intended for students of mechanics and mathematics
    specializing in computational mathematics.  It will be of interest to stu-
    dents of the theory and practice of numerical methods.

COVERAGE:  This is the first of a 2-volume work based on courses given in the
    Department of Mechanics and Mathematics at Moscow State University.  The
    book discusses operations with approximate numbers, the interpolation theory,
    numerical differentiation, numerical integration, and uniform and mean-
    square approximations of functions.  The authors thank Academician S.L. Sobolev,
    Corresponding Member of the Academy of Sciences, USSR;  Professor
    L. A. Lyusternik, Professor A. A. Lyapunov; Professor M. R. Shure-Bure;
    Docent A. D. Gorbunov; V. G. Kermanov; V. V. Rusanov; Yu. A. Shreyder; and

Card 1/7

*Berezin, I.S.*

BEREZIN, I.S.

The Department of Computing Mathematics of the Moscow State
University.  Usp.mat.nauk 12 no.3:255-261 My-Je '57.  (MIRA 10:10)
                    (Moscow University--Mathematical machines)

BEREZIN, I. S.

"The Cauchy Problem for Equations of the Hyperbolic Type With Initial
Given Quantities on the Parabolicity Line."  Sub 23 Apr 47, Moscow Order
of Lenin State U imeni M. V. Lomonosov

Dissertations presented for degrees in science and engineering in
Moscow in 1947

SO:  Sum No. 457, 18 Apr 55

PANASEVICH, M.A.; BEREZIN, I.P., kand. med. nauk

Case report on extrauterine pregnancy. Akush. i gin. 39 no.3:
132 My-Je'63                                      (MIRA 17:2)

1. Iz ginekologicheskogo otdeleniya ( zav. M.A. Panasevich)
58-y gorodskoy bol'nitsy (glavnyy vrach S.G. Rynkevich) Moskvy.

ACC NR: AP6031639

condition in the tissues. The following coefficients were used to analyze the results: $K_1$ represented the relationship of the maximal force of the current to the original force and also the degree of disturbance of the tissue after oxygenic stress. $K_2$, $K_3$, and $K_4$ represented the relation of the current forces at 60, 120, and 180 seconds after the first supply of oxygen. Analysis of the data showed that a single inoculation of DNPH produces a significant reduction in the saturation of oxygen in muscles, and increases oxygen consumption. In addition, a more severe experiment was conducted by applying arterial gaskets to the limbs and then inoculating DNPH. Analysis of this method also showed that a single inoculation of DNPH produces a significant increase (43%) in $O_2$ consumption. It was concluded that the electroanalytic method permits correlation of respiratory intensity in intact muscles of living organisms and expression of respiratory kinetics by a constant of reaction speed. This method of registering $O_2$ consumption in living tissues can also be used in tracing the effect of a small dose of DNPH over a long period of time. [WA-50; CBE No. 12]

SUB CODE: 06 / SUBM DATE: 07 Jan66 / ORIG REF: 010 / OTH REF: 002

Card 2/2

ACC NR: AP6031639                    (A)

AUTHOR: Popov, T. A.; Epshteyn, L. M.; Berezin, I. P.

ORG: Institute of General and Municipal Hygiene im. A. N. Sysin, AMN SSSR (Institut obshchey i kommunal'noy gigiyeny AMN SSSR); State Institute of Oncology im. I. A. Gertsen (Gosudarstvennyy onkologicheskiy institut); Institute of Experimental and Surgical Apparatus and Instruments, Moscow (Institut eksperimental'noy i khirurgicheskoy apparatury i instrumentov)

TITLE: Electroanalytic method of studying the speed of oxygen consumption in tissues in vivo in a sanitary-toxicological experiment

SOURCE: Gigiyena i sanitariya, no. 9, 1966, 67-71

TOPIC TAGS: electroanalysis, oxygen consumption, rat, histology, toxicology

ABSTRACT:

The electroanalytic method of studying $pO_2$ in the tissues of a living organism has been proven to be a sensitive test affiliated with the determination of the MPC (maximum permissible concentration) of a series of tissues. Experiments were conducted with white rats: in one group, a water solution of 2,4 dinitrophenol (DNPH) with a concentration of 1/2 $LD_{50}$ (1.5 mg/kg) was injected in the course of 80 days; in the second group the same dosage of DNPH was injected once; the third group was the control and received no injection. A specially constructed organic glass chamber which supplied 100% oxygen at a rate of 5 ℓ/min, thus allowing a full exchange of the air with respired $CO_2$, was used. An electronic self-recording potentiometer (YePPO9) studied the oxygenic

UDC: 615.9:614.37-092-07:616-008.922.1-074

Card 1/2

L 11375-67

ACC NR: AT6036498

after cut-off of oxygen breathed for 30 min at pressures of 1, 2, 3, and 3.6 at.

The 5th series was conducted at 3 at, but with $CO_2$ removed from the respiratory tract after external respiration with oxygen was cut off; the 6th series was designed to show the effect of $CO_2$ on tissue $O_2$ saturation at 3 at, and the 7th series studied the persistence of brain bioelectric activity when circulation and respiration cease simultaneously.

It was found that brain bioelectric activity in rabbits always persists considerably longer under conditions of pressure oxygen breathing than at normal pressure, and that up to a certain point the persistence of EEG activity increases with increased atmospheric pressures.

The experimental data obtained show that respiration of atmospheres with elevated $pO_2$ creates considerable oxygen reserves in the tissues, which may serve both therapeutic as well as other medical and biological purposes. [W.A. No. 22; ATD Report 66-116]

SUB CODE: 06 / SUBM DATE: 00May66

Card 2/2 egk

L 11375-67 EWT(1) SCTB DD/GD
ACC NR: AT6036498

SOURCE CODE: UR/0000/66/000/000/0065/0066

AUTHOR: Berezin, I. P.; Seregin, G. I.; Rostovtsev, B. N.

ORG: none

2 0

TITLE: Experimental evidence of the establishment of an oxygen reserve during oxygenation of tissues under high pressure [Paper presented at the Conference on Problems of Space Medicine held in Moscow from 24 to 27 May 1966]

SOURCE: Konferentsiya po problemam kosmicheskoy meditsiny, 1966. Problemy kosmicheskoy meditsiny. (Problems of space medicine); materialy konferentsii, Moscow, 1966, 65-66

TOPIC TAGS: hyperoxia, oxygen excess pressure, electroencephalography, animal physiology, tissue oxygen saturation

ABSTRACT: Because existing procedures for theoretical computation of the oxygen reserves created in the organism by excess pressure oxygen breathing are difficult and sometimes imprecise, studies were conducted to determine ex- perimentally the degree of oxygen reserves created in the animal organism under various definite conditions. The duration of continued EEG activity in the brain of rabbits after the cessation of respiration was used as an index of the oxygen reserve. Altogether, 7 series of experiments were con- ducted on 70 rabbits in an experimental pressurized operating room: the first 4 series studied the duration of continued brain bioelectric activity

Card 1/2

BEREZIN, I.P.; EPSHTEYN, I.M.; KASHCHEVSKAYA, L.A.

Use a pair of gold and iron electrodes in electrochemical registration of the oxygen regime in tissues in vivo. Eksper. khir. i anest. 9 no.3:18-19 My-Je '64.                (MIRA 18:3)

1. Nauchno-issledovatel'skiy institut eksperimental'noy khirurgi-cheskoy apparatury i instrumentov (dir. N.G. Anan'yev) i Onkolo-gicheskiy institut imeni Gertsena (dir. - prof. A.N. Novikova), Moskva.

ANAN'YEV, M.G.; BEREZIN, I.P.; SHCHUPAKOV, N.N.; KOPYLOV, V.I.

Surgery performed in an operating room under increased atmospheric
pressure. Eksper. khir. i anest. 9 no.3:14-18 My-Je '64.
(MIRA 18:3)

1. Nauchno-issledovatel'skiy institut eksperimental'noy khirurgi-
cheskoy apparatury i instrumentov (dir. M.G. Anan'yev) i Vsesoyuz-
nyy tsentral'nyy nauchno-issledovatel'skiy institut okhrany truda
(dir. M.Ye. TSutskov) Vsesoyuznogo tsentral'nogo soveta professional'-
nykh soyuzov, Moskva.

ANAN'YEV, M.G. (Moskva B-55, Novoslobodskaja ul., d.57/65, kv.15);
    BEREZIN, I.P.

    Operating room with high atmospheric pressure; a survey of
    the literature. Grud. khir. 6 no.6:93-98 N-D '64.
                                                    (MIRA 18:7)

    1. Nauchno-issledovatel'skiy institut eksperimental'noy khirur-
    gicheskoy apparatury in instrumentov (direktor: M.G. Anan'yev,
    Moskva.

BEREZIN, I.P.

Concentration of antibiotics in the blood and bile of chole-
cystitis patients. Antibiotiki 8 no.2:175-179 F'63. (MIRA 16:7)

1. Khirurgicheskoye otdeleniye (vedushchiy khirurg - prof. D.E.
Odinov) i klinicheskaya laboratoriya (zav. M.E.Chaban) 53-y
gorodskoy bol'nitsy (glavnyy vrach S.G. Rynkevich) Moskvy.
        (GALLBLADDER—DISEASES)    (ANTIBIOTICS)

BEREZIN, I. P. (Moskva, K-9, Stoleshnikov per., 5, kv. 36);
GOLOSOVSKAYA, M. A. (Moskva, Leninskiy pr., 7, kv. 20)

Cystoadenoma of the pancreas. Vop. onk. 6 no.12:57-59 '60.
(MIRA 15:7)

1. Iz khirurgicheskogo otdeleniya (vedushchiy khirurg - prof.
D. E. Odinov), patologoanatomicheskogo otdeleniya (zav. otdeleniyem -
prof. I. A. Kusavitskiy) 53-y Moskovskoy gorodskoy bol'nitsy
(glavnyy vrach - S. G. Rynkevich).

(PANCREAS—TUMORS)